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MAINTENANCE COST ANALYSIS OF THE E-2A/ATDS SQUADRONS DEPLOYED I--ETC(U)
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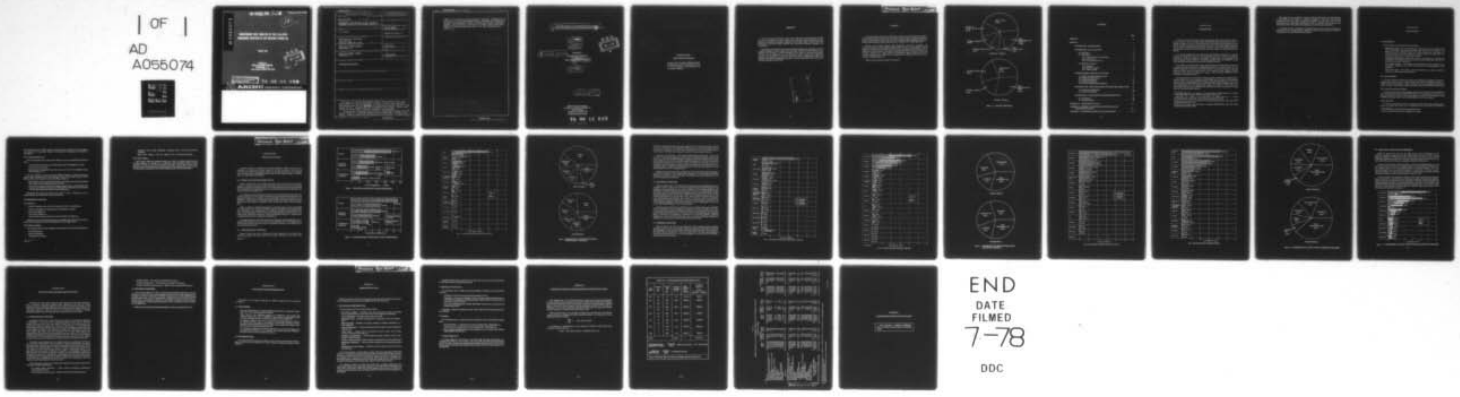

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MAINTENANCE COST ANALYSIS OF THE E-2A/ATDS SQUADRONS DEPLOYED IN THE WESTERN PACIFIC (U)

March 1970

Prepared for
NAVAL AIR SYSTEMS COMMAND
WASHINGTON, D. C.
under Contract N00019-70-C-0253

ARINC RESEARCH CORPORATION

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The analyses revealed that cost levels are significantly higher than comparable values for a training squadron at North Island NAS, San Diego, California. Possible reasons for the differences are discussed. A detailed tab-

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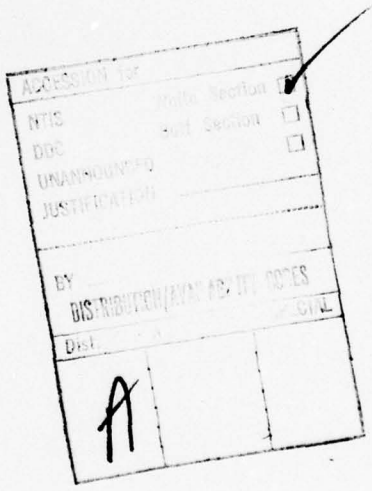
The analyses revealed that cost levels are significantly higher than comparable values for a training squadron at North Island NAS, San Diego, California. Possible reasons for the differences are discussed. A detailed tabulation of the results of the analysis is included, covering cost per flight-hour, cost per maintenance action, man-hours per flight-hour, man-hours per maintenance action, and mean time between maintenance actions. Cost categories considered are organizational maintenance labor, intermediate maintenance labor, and part replacement and overhaul.



SUMMARY

As part of a system effectiveness study of the Airborne Tactical Data System (ATDS) in the E-2 series aircraft, a maintenance cost analysis was performed on operational squadrons deployed in the Western Pacific. Data from five squadrons deployed during the period 1 October 1967 through 31 March 1968 were used, covering a total of 3901 flight hours.

Results of the analysis showed that maintenance costs were consistently and significantly higher for the deployed squadrons than for the North Island NAS training squadron which served as the data base for previous cost analyses. The difference can be attributed to several problems encountered in the Western Pacific squadrons, including high corrosion control costs, a large number of unscheduled engine overhauls in the non-electronic subsystem, and a higher ratio of operating hours to flight hours for the electronic equipment during deployment.

Figure S-1 shows the gross results of the analysis.

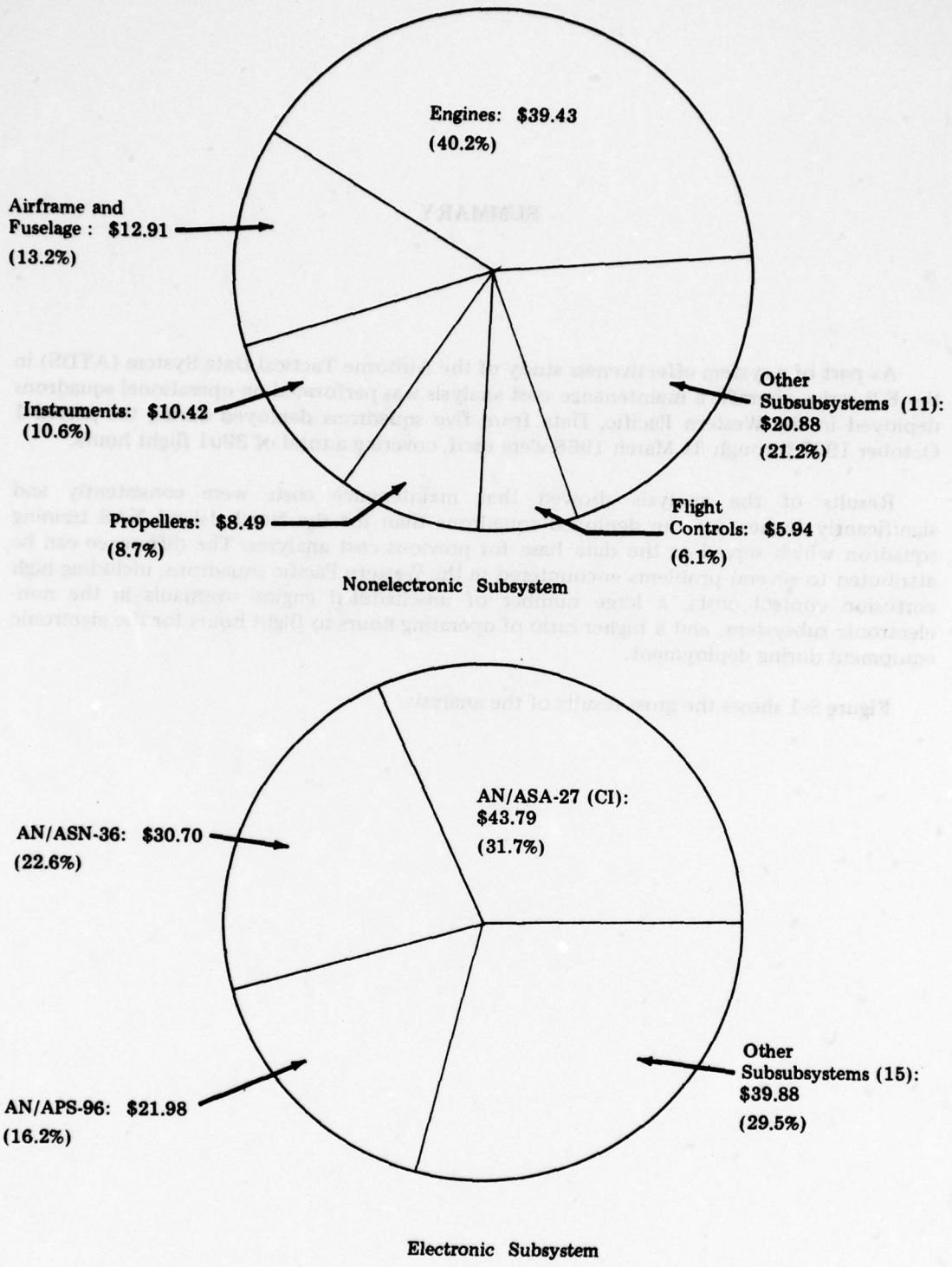


Figure S—1. **COST PER FLIGHT HOUR**

CONTENTS

CHAPTER ONE

INTRODUCTION

As part of a system effectiveness study of the Airborne Tactical Data System (ATDS) in the E-2A aircraft, under NAVAIR Contract N00019-70-C-0253 and preceding contracts a number of analyses of the cost of maintenance have been performed and reported upon by ARINC Research Corporation during the past five years.* All of these analyses have dealt with the training squadron stationed at Naval Air Station, North Island, California (NORIS); adequate data on squadrons located elsewhere were not available to ARINC Research until recently.

It is readily apparent that the operational and maintenance activities of a training squadron at a Naval Air Station may not be representative of the activities of a deployed, carrier-based, operational squadron; accordingly, the maintenance costs presented in the previous analyses require validation in operational squadron usage. The availability of data from operational squadrons has now made such validation practical.

The ATDS is a complex airborne early warning system for detecting hostile aircraft and controlling interceptor aircraft at a considerable distance from an aircraft carrier. It is the airborne extension of the Naval Tactical Data System, the carrier-based, carrier-controlled network which relays tactical data directly to the monitors of the Officer in Tactical Command. (The system is described in detail in the NAVAIR 01-85WBA-2 Series Maintenance Instruction Manuals.)

The avionics portion of the ATDS is undergoing major modifications (program Mod Ax which will result in a new configuration denoted E-2B). Also in progress is a development program aimed at improving system effectiveness through further changes in the avionic subsystems; the resulting design will be denoted E-2C. The effectiveness improvement of the new configurations can be measured only against the baseline of the E-2A; since maintenance costs are a part of effectiveness, these must be known as accurately as possible under all normal operating conditions.

**A Preliminary Maintenance Cost Analysis of the E-2A/ATDS* (U), Special Report No. 5, Contract N123(61756)50249A, July 1965, ARINC Research Publication 322-01-5-511.

A Maintenance Cost Analysis of the E-2A/ATDS, (U), Special Report No. 7, Contract N123(61756)54538A, January 1966, ARINC Research Publication 407-01-3-557.

Maintenance Cost Analysis of the E-2A/ATDS (U), Contract N123(61756)56869A, March 1967, ARINC Research Publication 414-01-8-741.

Maintenance Cost Analysis of the E-2A/ATDS (U), Contract N00019-68-C-0152, May 1968, ARINC Research Publication 563-01-2-888.

This report, then, is intended as a source of reference data for the cost of maintenance of E-2A/ATDS aircraft deployed in operational squadrons. Tables and charts detailing unscheduled labor costs, parts replacements, overhaul costs, and labor costs (at both organizational and intermediate maintenance levels) are included. Both the avionic and nonavionic portions of the system are analyzed in as much depth as the data allow.

In addition, general comparisons are presented between the results for the deployed squadrons and the training squadron studied in previous analyses; probable reasons for major differences are postulated wherever possible.

CHAPTER TWO

DATA ANALYSIS

2.1 DEFINITIONS

Several terms must be explicitly defined, as follows:

- **Maintenance Action:** Any unscheduled action, or group of actions, by organizational and/or intermediate maintenance personnel that results in the initiation of a Maintenance Action Form(s) (MAF). All MAFs containing the same basic Job Control Number (JCN) and referencing a specific Work Unit Code (WUC) are considered as part of the same Maintenance Action.
- **Unscheduled Maintenance:** Maintenance action as the result of a complaint by operational or maintenance personnel, denoted in the 3M Data System* by Code "B" in the "Type of Action" data entry.
- **Job Control Number:** A 3M System job identification number assigned by the maintenance organization to an MAF or sequence of MAFs stemming from an initial complaint.
- **Work Unit Code:** A 3M System numerical designator for a specific subsystem, assembly, or subassembly being maintained.

2.2 DATA SOURCES

The major sources of data for the analysis were 3M data tapes supplied by NATSF.** Details on the methods used to collate and sort these data are contained in Appendix A. Additional data were supplied by ARINC Research Corporation representatives stationed at Naval Air Station, North Island, California (NORIS), and by Code AIR-4116 of NAVAIR.

2.2.1 Period Covered by the Analysis

The data used were from five squadrons deployed in the Western Pacific (WESTPAC) from 1 October 1967 through 31 March 1968. Not all of the squadrons were in that area for the entire period; the data used from each squadron were limited to the squadron's actual WESTPAC deployment dates. A total of 3901 flight hours were accumulated.

2.2.2 Labor Costs

To allow for comparisons between operational-squadron results and training-squadron results, no changes were made in the computation of the cost of labor; the $6.50 per

*Naval Maintenance and Material Management Reporting System.

**Naval Air Technical Services Facility, Philadelphia, Pennsylvania.

man-hour figure used in ARINC Research Publication 563-01-2-888* was used throughout this analysis. For convenience, details on the method of computation are repeated in Appendix B.

2.2.3 Part and Overhaul Cost

The following data sources were used to obtain the cost of nonrepairable replacement parts:

- Initial Outfitting Lists from the Aviation Supply Office, Philadelphia, Pa. (ASO)
- Navy Stock Lists from ASO
- Fleet-oriented Consolidated Stock Lists from the U.S. Navy Fleet Material Support Office, Brooklyn, N. Y.

For items shipped to Naval Air Rework Facilities (NARF) or commercial (factory) repair facilities (as indicated by codes 1 through 8 in the "Action Taken" entry in the 3M System), either of two courses of action were taken, as follows:

- When NARF was the cognizant repair facility, and average repair costs were available from NARF records, these average costs were used.
- When a factory repair facility was the cognizant repair facility, or when NARF repair costs were not available, the repair cost was assumed to be 20 percent of the purchase cost. This figure was derived from the sources listed above.

Throughout this report, the term "part costs" is used to indicate the sum of replacement part costs and NARF or factory repair costs.

2.3 METHODS OF ANALYSIS

2.3.1 Measures

A number of measures were used in the data analysis. Major cost measures are:

- Labor cost per flight hour (organizational, intermediate, combined)
- Part cost per flight hour
- Total cost per flight hour
- The above three items per maintenance action instead of per flight hour

Additional measures used include man-hours per flight hour, man-hours per maintenance action, and mean time between maintenance actions (in flight hours).

2.3.2 Depth of Analysis

The measures listed above were applied, where applicable, to the following subdivisions:

- E-2A/ATDS system
- Electronic subsystem
- Nonelectronic subsystem

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- Equipment and Aircraft Replaceable Assembly (ARA) level for the electronic subsystem
- Major WUC category (first two digits) for the nonelectronic subsystem.

2.3.3 Other Analysis

Where major differences appeared between the results for deployed squadrons and training squadrons, the reasons for the differences were investigated. These consisted primarily of analysis of the 3M data entries for patterns which would indicate major problems such as very high man-hour entries, high part costs, repeated actions, etc. This was supplemented by information from ATDS maintenance personnel wherever possible.

CHAPTER THREE

RESULTS OF ANALYSIS

Appendix C presents a detailed data tabulation showing the analysis results at system, subsystem, and ARA levels. Various aspects of the data contained in the table are considered in the following paragraphs, making use of chart presentations of the tabulated data. All charts include comparisons with the data for the training squadron at NORIS, taken from Publication 563-01-2-888.*

3.1 SYSTEM AND MAJOR SUBSYSTEM LEVELS

Figure 1 presents the cost per flight hour (labor, parts, and total) for the complete system, the electronic subsystem, and the nonelectronic subsystem. In the case of deployed squadrons, the electronic subsystem accounts for 58 percent of system total costs per flight hour, or $136.35 out of $234.42 per hour; it accounts for 62.6 percent of total labor costs and 55.7 percent of total parts costs.

The costs per hour for the deployed squadrons are considerably higher than those of the training squadron for both the total system and the major subsystems. Several factors are believed to contribute to the higher costs, including high corrosion control labor costs in WESTPAC, a large number of unscheduled engine overhauls, and higher operating hours per flight hour for the electronic equipments. These are discussed in more detail in Chapter Four.

Figure 2 presents an additional breakdown of the labor portion of the cost per flight hour; this, however, is in terms of maintenance man-hours per flight hour for organizational and intermediate levels of maintenance. For deployed squadrons, organizational maintenance is more than half (57 percent) of the overall system maintenance; this, however, is the result of the nonelectronic subsystem, where approximately 92 percent is organizational, overbalancing the electronic subsystem with 36 percent.

It is apparent that the major differences between deployed and training squadrons are in organizational maintenance for the nonelectronic subsystem, and in intermediate maintenance for the electronic subsystem; there is no significant difference in the distribution of total maintenance man-hours.

3.2 NONELECTRONIC SUBSYSTEM

Figure 3 presents the cost of maintenance for the subdivisions of the nonelectronic subsystem in terms of labor, parts, and total, and Figure 4 presents the percentage of total

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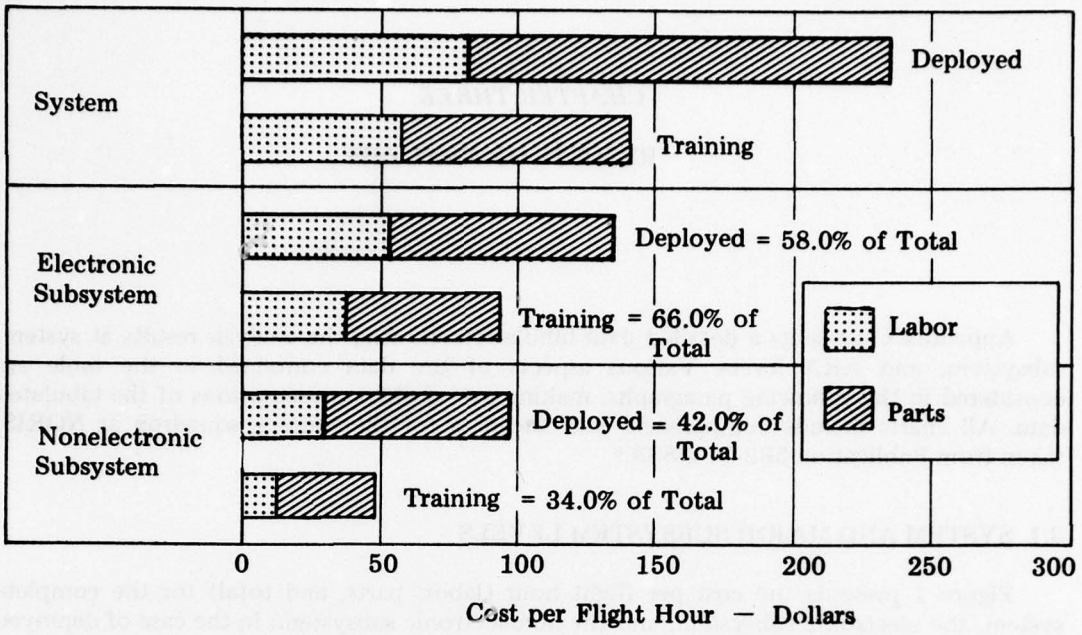


Figure 1. **COST PER FLIGHT HOUR, MAJOR SUBDIVISIONS**

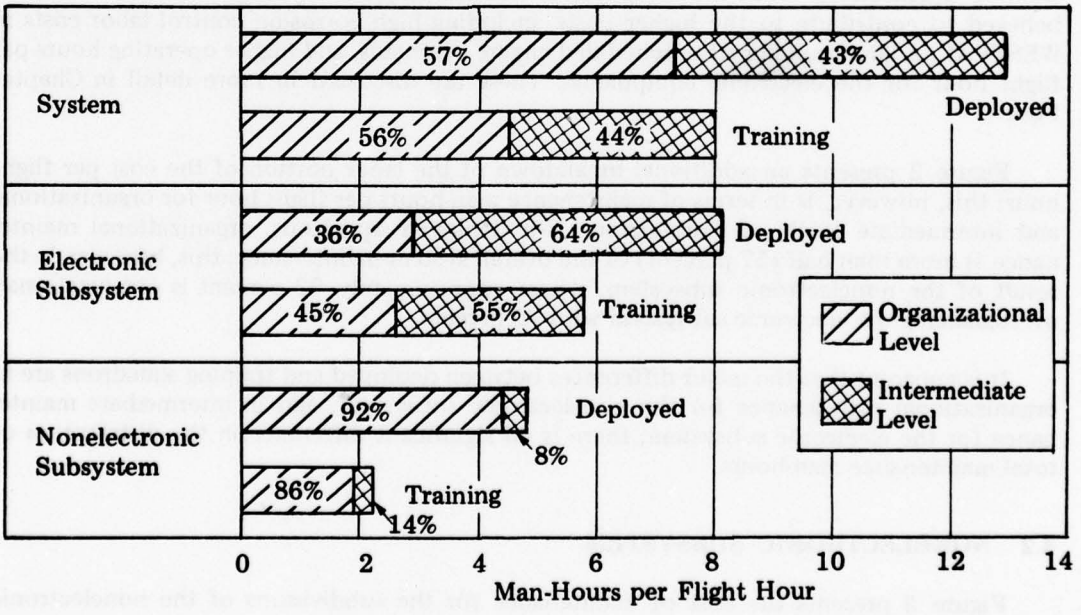


Figure 2. **MAN-HOURS PER FLIGHT HOUR, MAJOR SUBDIVISIONS**

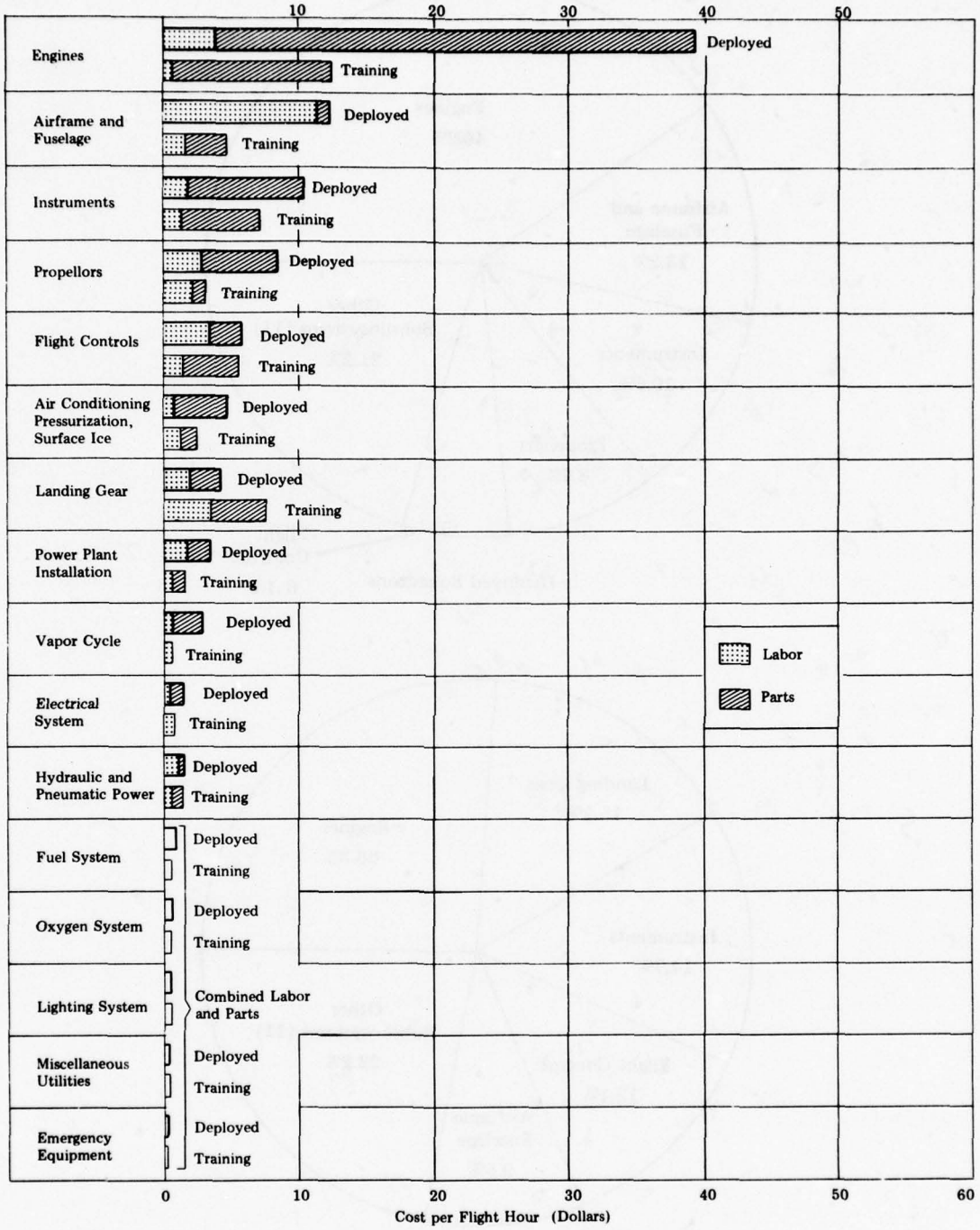
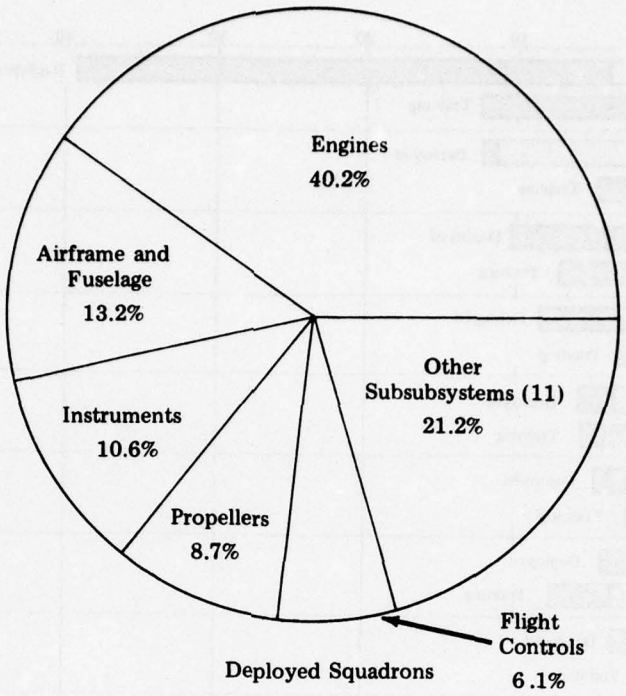


Figure 3. COST PER FLIGHT HOUR, NONELECTRONIC SUBSYSTEM



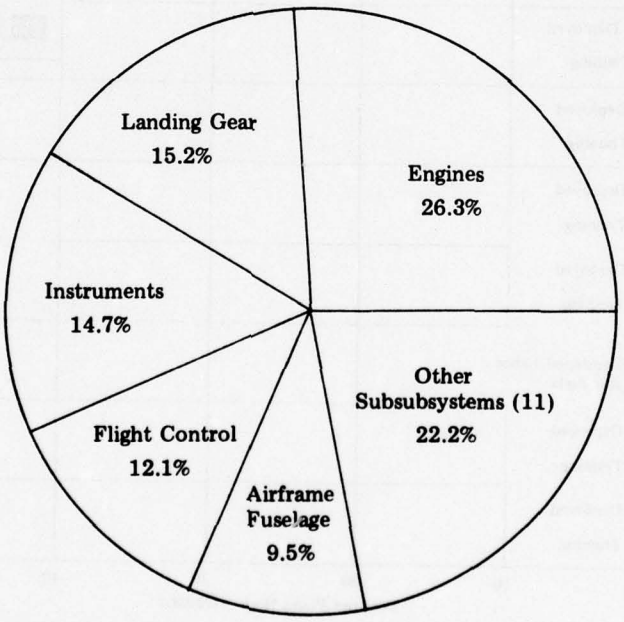


Figure 4. **DISTRIBUTION OF COSTS PER FLIGHT HOUR, NONELECTRONIC SUBSYSTEM**

subsystem costs represented by the major contributors. For deployed squadrons, engines account for 40.2 percent of the $98.07 per flight hour total costs; airframe and fuselage for 13.2 percent; instruments for 10.6 percent; propellers for 8.7 percent; and flight controls for 6.1 percent. The other eleven categories account for the remaining 21.2 percent.

Two out of 16 categories — the engines and the airframe and fuselage — account for over half of all subsystem maintenance costs. These two categories are those involved in the corrosion control and unscheduled engine overhauls mentioned previously, which account for the differences between the training and deployed squadrons. It will be noted that the landing gear category is the only one to show a decrease in actual costs as well as in percentage. This is attributed to greatly reduced tire replacements, since there are far fewer landings in relation to flight hours during deployment. (A large part of the flying time in the training squadron consists of landing practice.)

Figure 5 presents the man-hours per flight hour for the organizational and intermediate levels for the elements of the nonelectronic subsystem. It is evident that intermediate maintenance accounts for only a small part of the maintenance on this subsystem or any of the items composing the subsystem.

3.3 ELECTRONIC SUBSYSTEM

Figure 6 presents the cost of maintenance for the equipments comprising the electronic subsystem in terms of labor, parts, and total, and Figure 7 presents the percentages of total subsystem costs represented by the major contributors. For deployed squadrons, the AN/ASA-27 Computer Indicator Group accounts for 31.7 percent of the $136.35 per flight hour total costs; the AN/ASN-36 Inertial Navigation System covers 22.6 percent; and the AN/APS-96 Radar involves 16.2 percent. Fifteen other equipment types account for the remaining 29.5 percent. In the first three cases, well over half of the total costs are part costs (replacements and overhaul); 78.6 percent of total part costs in the electronic subsystem are for these three equipments, as compared to 58.3 percent of total labor costs of the deployed squadrons. These percentages do not differ significantly from the 79 percent and 60 percent figures for the training squadron.

Figure 8 presents man-hours per flight hour for the organizational and intermediate levels of maintenance for the equipments composing the electronic subsystem. In contrast to the nonelectronic subsystem, intermediate maintenance is the major factor in labor costs, accounting for more than 64 percent of the total. For the training squadron, the comparable figure is 56 percent. The difference is attributed to the pressure applied in deployed squadrons to keep the aircraft flying. This puts a premium on reducing organizational maintenance to a minimum by replacing ARAs as quickly as possible.

3.4 COMBINED SUBSYSTEMS

Figure 9 presents the total cost per flight hour for the components of the combined subsystems which account for the greatest portion of maintenance costs; Figure 10 presents the percentages of total cost of the major contributors. Three out of 35 — the AN/ASA-27, the engines, and the AN/ASN-36 — account for almost half of the $234.42 per flight hour total cost. This also holds true for the training squadron, except that the AN/APS-96 is included rather than the engines.

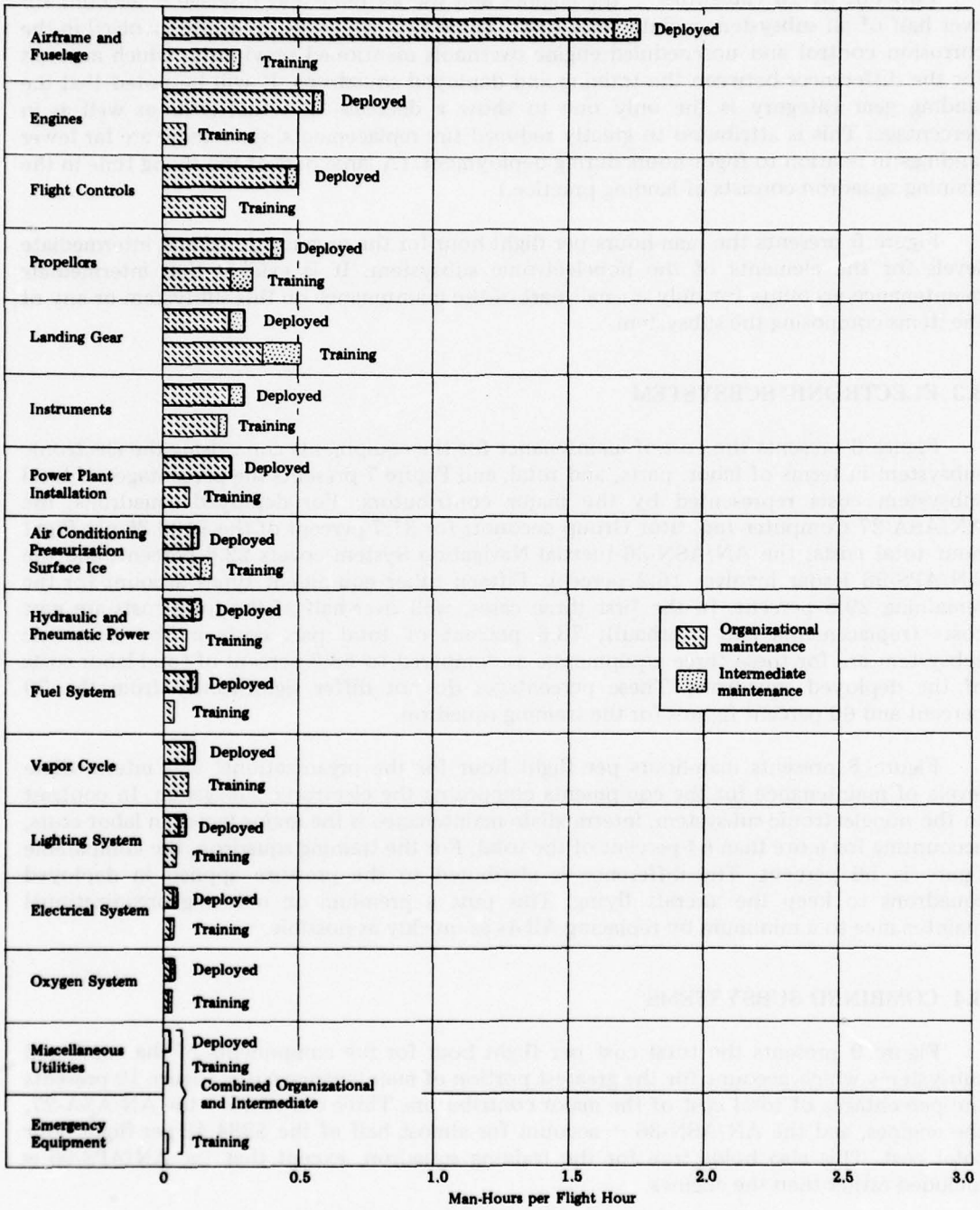


Figure 5. **MAN-HOURS PER FLIGHT HOUR, NONELECTRONIC SUBSYSTEM**

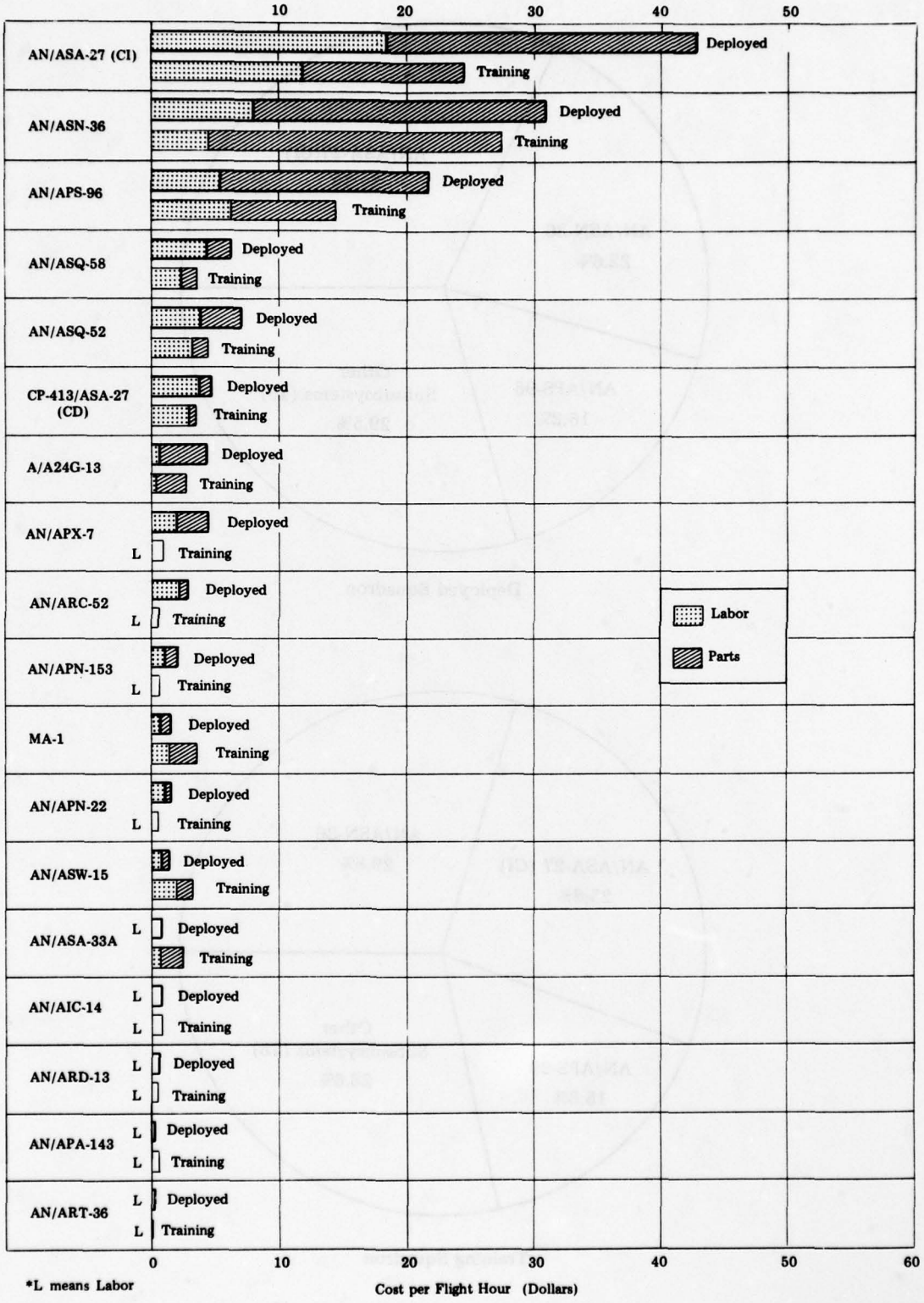
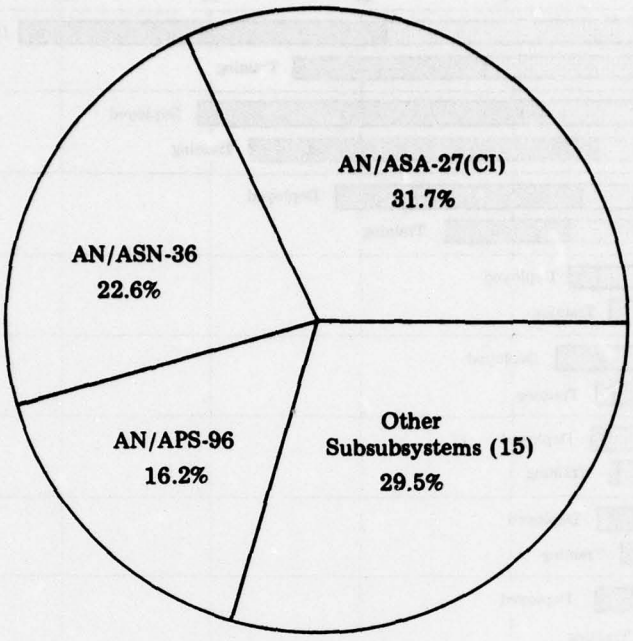
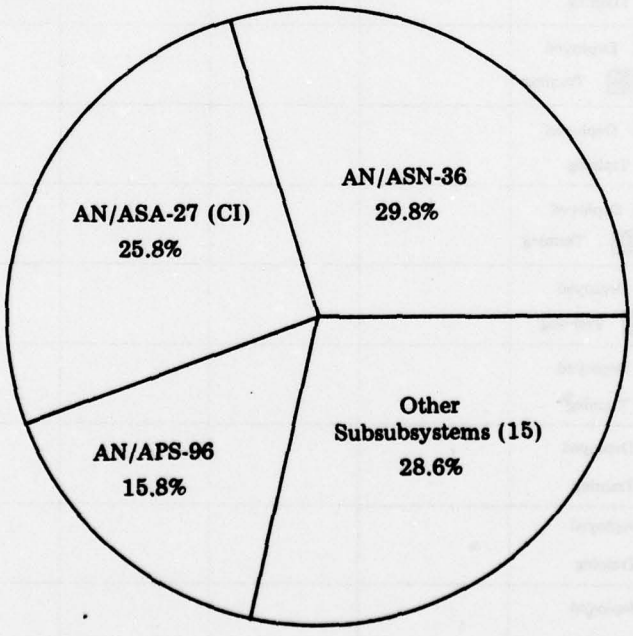


Figure 6. **COST PER FLIGHT HOUR, ELECTRONIC SUBSYSTEM**



Deployed Squadron



Training Squadron

Figure 7. **DISTRIBUTION OF COSTS PER FLIGHT HOUR, ELECTRONIC SUBSYSTEM**

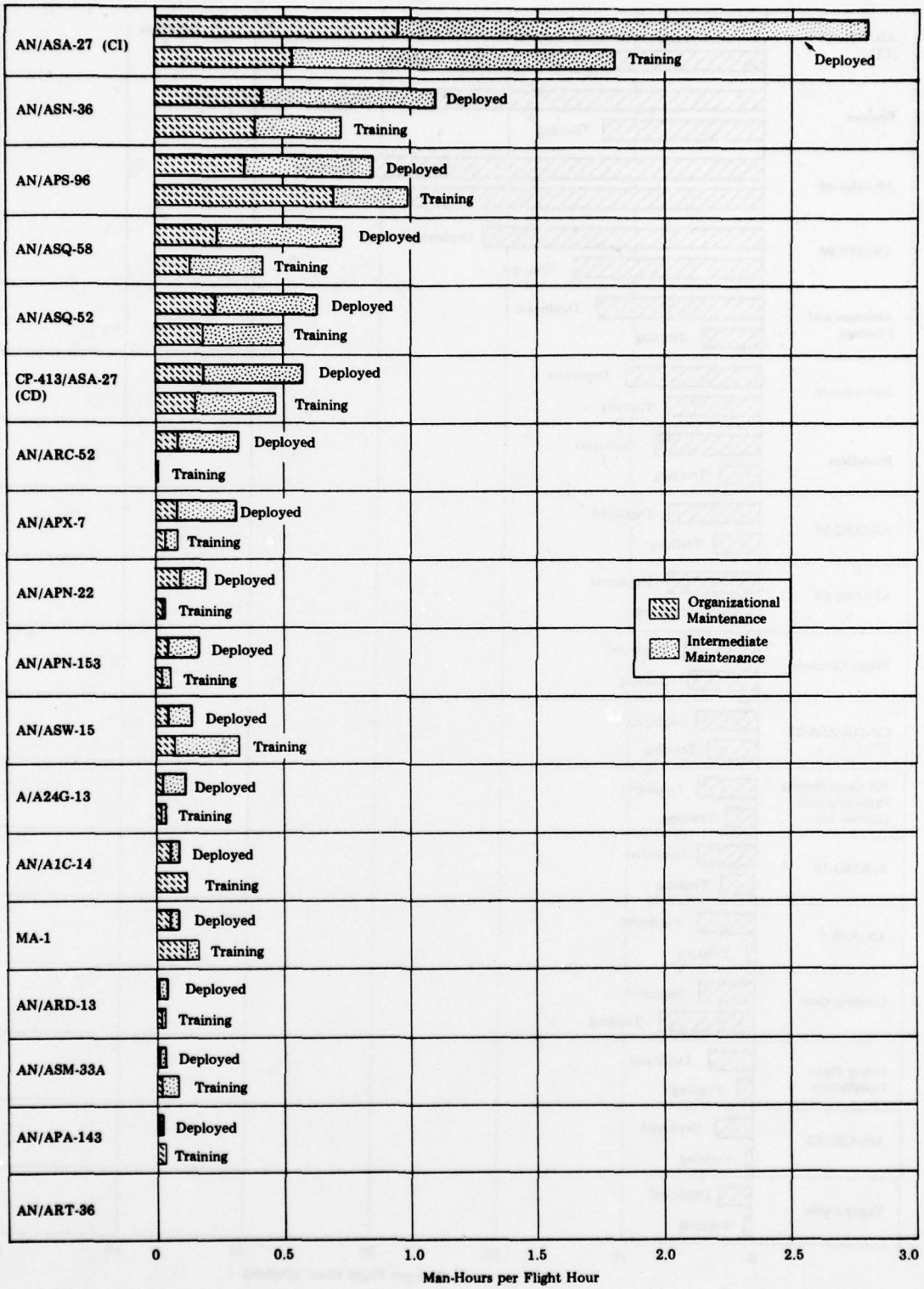


Figure 8. **MAN-HOURS PER FLIGHT HOUR, ELECTRONIC SUBSYSTEM**

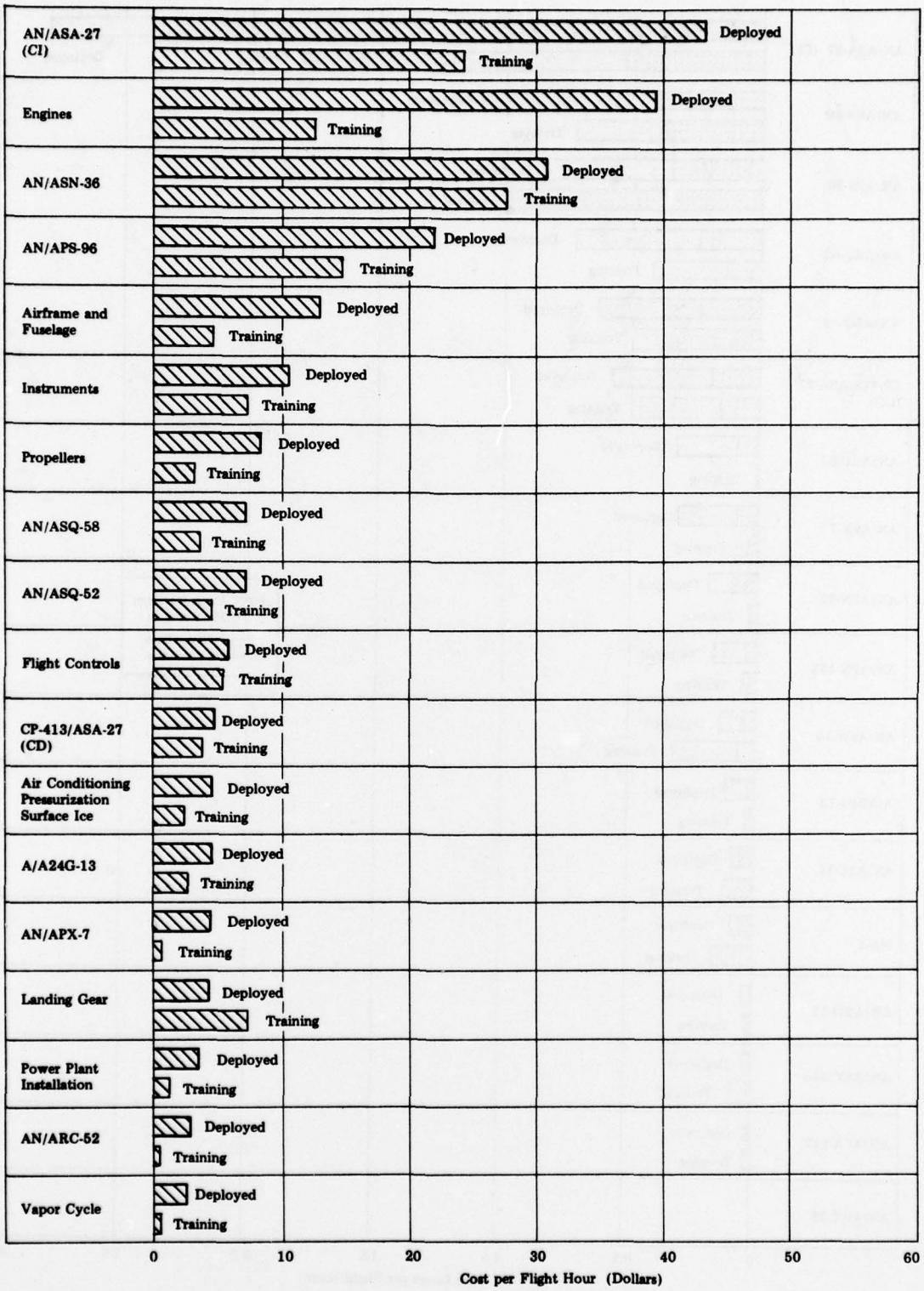
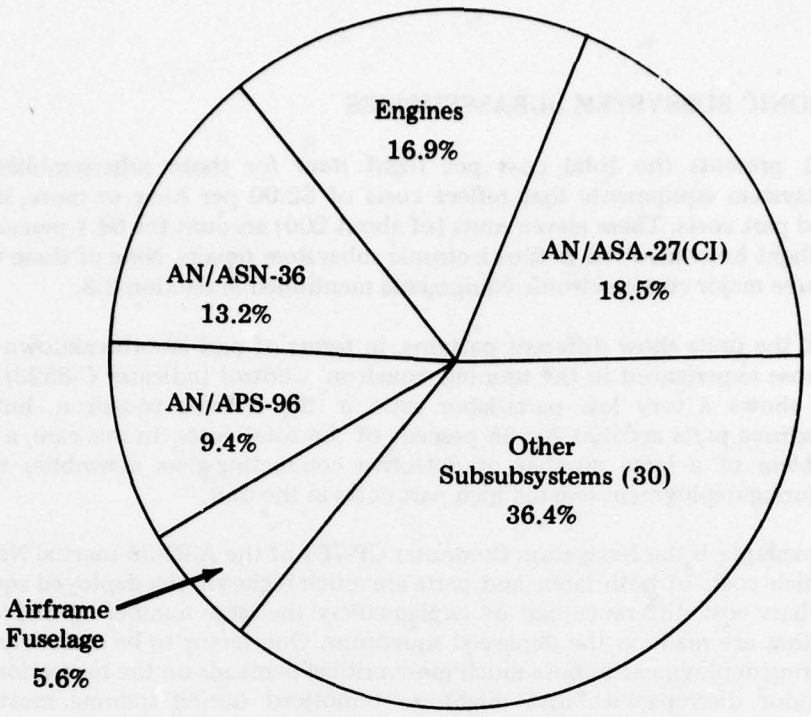
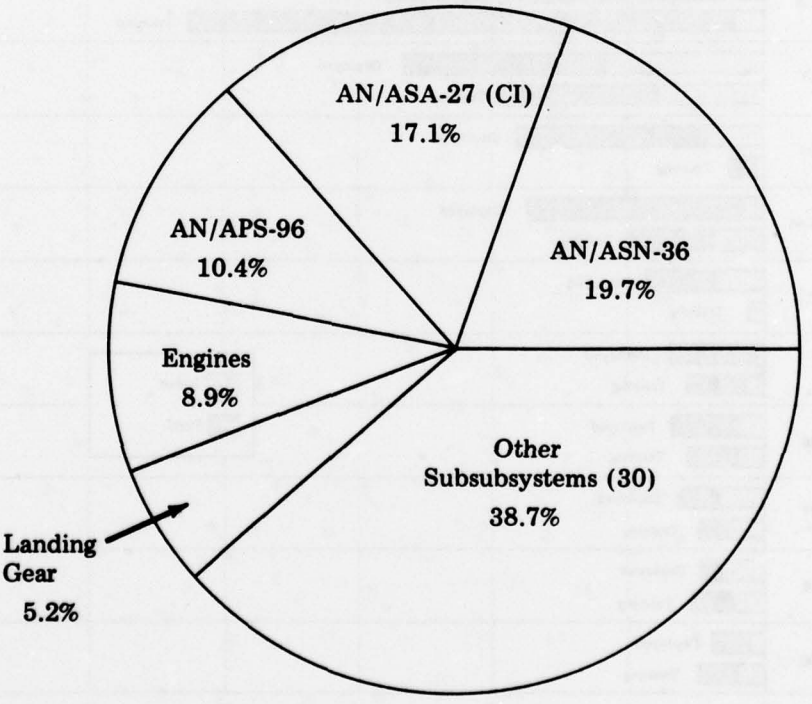


Figure 9. **COST PER FLIGHT HOUR, COMBINED SUBSYSTEMS**



Deployed Squadron



Training Squadron

Figure 10. **DISTRIBUTION OF TOTAL COSTS, COMBINED SUBSYSTEMS**

3.5 ELECTRONIC SUBSYSTEM SUBASSEMBLIES

Figure 11 presents the total cost per flight hour for those subassemblies of the electronic subsystem equipments that reflect costs of $2.00 per hour or more, including both labor and part costs. These eleven units (of about 200) account for 64.4 percent of the $136.35 per flight hour involved in the electronic subsystem repairs. Nine of these units are parts of the three major cost electronic equipments mentioned in Section 3.3.

Several of the units show different patterns, in terms of part-laborbreakdown or total costs, from those experienced in the training squadron. Control Indicator C-3323/ASA-27, for example, shows a very low parts/labor ratio in the training squadron, but in the deployed squadrons parts account for 65 percent of the total costs. In this case, a specific, one-time problem of a large number of defective conducting-glass assemblies requiring replacement during deployment created high part costs in the unit.

Another example is the Navigation Computer CP-751 of the ASN-36 Inertial Navigation System, in which costs of both labor and parts are much higher in the deployed squadrons. Much of the part cost difference can be explained by the large number of shaft-encoder replacements that are made in the deployed squadrons. One factor to be considered is that operations during deployment impose much more critical demands on the navigation system and hence minor discrepancies that might go unnoticed during training must receive attention under deployment conditions.

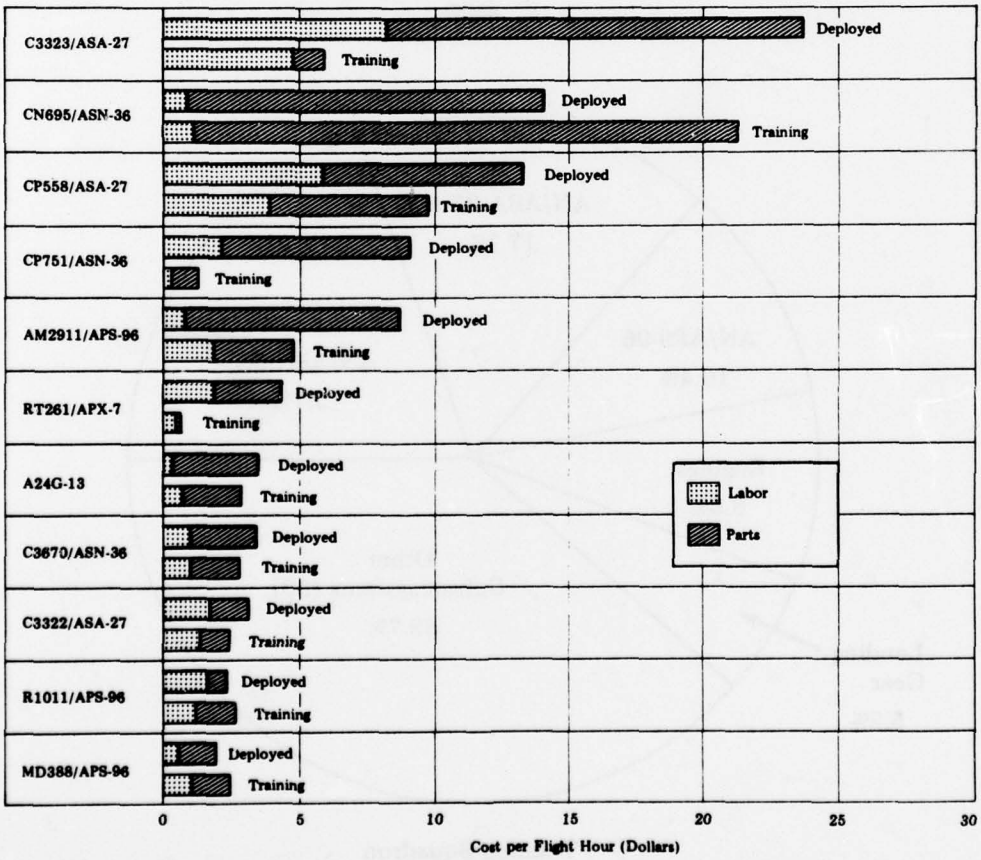


Figure 11. **SUBASSEMBLY COST PER FLIGHT HOUR, ELECTRONIC SUBSYSTEM**

CHAPTER FOUR

DEPLOYED VERSUS TRAINING SQUADRON COSTS

In general, the results confirm the premise that the labor, parts, and total maintenance costs in deployed, operational squadrons differ significantly from those of training squadrons, and are consistently higher. The total costs are about 66 percent higher, while labor costs are 59 percent higher and parts costs are 69 percent higher. Higher costs are also consistently reflected in both the electronic and nonelectronic subsystems, although individual categories within the subsystems do not necessarily follow this pattern.

4.1 NONELECTRONIC SUBSYSTEM

As indicated in Section 3.1, a large portion of the costs for the nonelectronic subsystem is attributable to two major factors: unscheduled engine removal with the associated overhaul parts and labor costs, and corrosion control labor costs. Eight engines were removed and replaced, requiring 1431 man-hours or 66 percent of the total man-hours charged against the engines. Because they were beyond the capability of maintenance, five of these engines were sent out for overhaul at an average cost of $23,200 each or $116,000 total. (These costs reflect more than 83 percent of the total engines parts costs). Approximately 4700 man-hours were expended in corrosion control on the Airframe and Fuselage. This represents the expenditure of 68 percent of the man-hours in this category, and 25 percent of total nonelectronic subsystem man-hours. These two factors combined account for 31 percent of subsystem labor costs and 44 percent of subsystem parts costs.

The data on engine removals can be considered typical; the complaints are of "leaking" and "excessive oil consumption" and, in one instance, "foreign object damage". The data on corrosion control, however, may not be typical. One squadron, which flew 30 percent of the total flight hours, expended about 60 percent of the man-hours spent in corrosion control. The amount of effort expended on corrosion control is undoubtedly related to the particular maintenance policy established by a squadron, and the location of operations. Wide variances can therefore be expected. However, since five WESTPAC squadrons are represented in the data, it is believed that it is satisfactory to use the results until such time as additional data are made available for analysis. (Obviously, locations with less rigorous climates than that in WESTPAC can expect to experience lower maintenance costs, since corrosion control requirements will not be as severe.)

Other maintenance actions on the nonelectronic subsystem that required a large number of man-hours include the following:

- Air Turbine Starter difficulties — Thirty instances (including cannibalization) involving 264 man-hours
- Aileron Tandem Actuator repairs — Thirteen instances involving 369 man-hours

- Jackscrew repairs — Five instances involving 283 man-hours
- Propeller cannibalization — Twelve instances involving 317 man-hours
- Propeller Hub Blade Assembly repairs — Eight instances involving 332 man-hours.

4.2 ELECTRONIC SUBSYSTEM

It was noted in Section 3.1 that one of the reasons for higher maintenance costs per flight hour for deployed versus training squadrons was believed to be higher operating hours per flight hour. Recent observations by ARINC Research personnel at the NORIS training squadron indicate that a ratio of approximately 1.5 flight hours per operating hour may be representative of that squadron's operations. (These figures are based on clock readings on several equipments.) During deployed operations, however, operating hours are very nearly equal to flight hours.

Reasons for some individual subassembly differences were presented in Section 3.5.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATION

The results of the analyses conducted by ARINC Research led to the following conclusions.

5.1 CONCLUSIONS

- The cost of maintenance for deployed E-2A/ATDS squadrons is significantly higher than those for the training squadron at NORIS.
- Major causes for the significant difference in maintenance costs include high corrosion-control labor costs in WESTPAC, large numbers of unscheduled engine overhauls, and higher electronic equipment operating hours per flight hour.
- No significant difference between the deployed and training squadrons is found at the system level with respect to the division of maintenance man-hours between organizational and intermediate levels. The differences are significant, however, at the electronics and nonelectronic subsystem levels.
- In the electronics subsystem, the major contributors to the cost of maintenance are not significantly different for the deployed and training squadrons. Significant differences do exist in the nonelectronic subsystem.

5.2 RECOMMENDATION

It is recommended that the data contained in this report be used as the basic reference against which the cost of maintenance of future deployed operational squadrons will be compared.

APPENDIX A

COMPILATION OF DATA

With the exception of the cost per maintenance man-hour, factory-repair costs, and part costs, all data used in this report were compiled from the Navy 3M system.

1. Navy 3M System Maintainability Data

The data elements used in the analysis were as follows:

- **Job Control Number** — Identifies each basic maintenance action and resulting actions, including the date of the basic action and the originating organization
- **Type of Equipment** — Identifies E-2A aircraft using ATDS
- **Maintenance Level** — Identifies organizational or intermediate (shop) level maintenance
- **Work Unit Code** — Identifies the system, equipment, assembly, subassembly, etc., being maintained
- **Type of Maintenance** — Denotes maintenance action's origin, such as unscheduled, inspection, etc.
- **Action Taken** — General report on maintenance action's result, such as repair, removal, removal and replacement, etc.
- **Symptom of Malfunction** — Coded designator showing symptom, such as open, shorted, nothing wrong, etc.
- **Number of Items Involved** — Shows quantity of identical items in any specific action
- **Maintenance Man-Hours** — Total man-hours expended for each maintenance-action report
- **Manufacturer and Part Number** — Delineates the item (within the Work Unit Code) being replaced

To use the raw data, it was necessary to select only those maintenance reports that referred to the squadrons of interest and started within the selected time period. It was then necessary to sort these by Work Unit Code within Job Control Number so that all actions that resulted from a basic action were grouped. (Each such group is considered as a maintenance action.) Maintenance man-hours were then totalled for each Work Unit Code. A printout of the data so sorted was the basic reference for the current analysis.

An additional printout of those data entries that contained manufacturer and part-number information was made after sorting by Job Control Number within Work Unit Code within Action Taken within Part Number categories. This was done to facilitate the costing of part replacements, since cost data provided by the 3M system were inadequate for this purpose.

Aircraft Statistical Data reports from the 3M system were used to provide squadron aircraft flight hours for the period under study.

2. Maintenance Man-Hour Costs

The following sources of data were used to compute an average cost per maintenance man-hour:

- Tabulation of active duty basic pay scales by length of service
- Tabulation of personnel of Squadron VAW-11 actually performing maintenance on E-2A/ATDS, the tabulation including pay grades, length of service, and percentage of time spent on the E-2A/ATDS
- Data from OASD-Manpower, showing relationship of basic pay to actual pay and supplemental benefits

Appendix B details the methods by which a rate of $6.50 per maintenance man-hour was computed.

3. Part Costs

The following sources of data were used to obtain the cost of nonrepairable replaced parts:

- Initial Outfitting Lists, prepared by the Aviation Supply Office, Philadelphia, Pa.
- Navy Stock Lists, prepared by the Aviation Supply Office, Philadelphia, Pa.
- Fleet Oriented Consolidated Stock Lists, prepared by the U.S. Navy Fleet Material Support Office, Brooklyn, N. Y.

4. Factory Repair Costs

For items shipped to the factory or the O&R Shop for repair (as indicated by a numerical code 1-8 in the "Action Taken" entry in the 3M system) 20 percent of purchase cost of the items, derived from data previously obtained, were used as the cost of repair. Purchase costs of the items were obtained from the same sources as noted in Section 2 of this appendix.

APPENDIX B

METHOD OF COMPUTING COST PER HOUR FOR MAINTENANCE LABOR

The average hourly cost of labor performed by maintenance personnel was determined from the tabulation of active duty basic pay scales in effect January 1967. From a listing of the personnel of Squadron VAW-11, the number of personnel in each pay grade, the average length of service for each pay grade, and the percentage (estimated) of time spent on maintenance of the E-2A aircraft was determined. These data were used in the manner shown in Table B-1 to compute a basic hourly pay of $1.69.

Table B-2 shows that, on the average, the basic pay is only 58 percent of actual pay received and that an additional 24 percent should be added to the actual pay to cover supplemental benefits received:

$$\frac{1.69}{0.58} \times 1.24 = \$3.61 \text{ per hour}$$

In addition, an overhead factor of 80 percent was added to reflect fixed costs, supervision, support services, etc.:

$$\$3.61 \times 1.80 = \$6.50 \text{ per hour} = \text{maintenance-labor cost}$$

TABLE B—1. **CALCULATIONS OF BASIC HOURLY PAY**

Pay Grade	Number of Men	Percent Time on E-2A	Effective Number of Men	Basic Monthly Pay* (Dollars)	Total Pay Column 4 × Column 5 (Monthly — Dollars)
E3	10	40	4.0	170.10	680.40
E4	20	100	33.6	222.90	7489.44
	34	40			
E5	12	100	26.0	270.00	7020.00
	35	40			
E6	12	100	21.6	328.80	7102.08
	24	40			
E7	9	100	13.0	393.60	5116.80
	10	40			
E8	4	100	5.2	487.20	2533.44
	3	40			
E9	1	100	1.0	599.10	599.10
Total			104.4		30,541.26

$$\frac{\text{Monthly Total Pay}}{\text{Effective No. of Men}} = \frac{30{,}541.26}{104.4} = 292.54 \text{ avg. pay/mo.} \times 12 = 3510.48/\text{year}$$

$$\frac{\text{Yearly Pay}}{\text{2080 hrs./year}} = \frac{3510.48}{2080} = 1.69 \text{ Basic Hourly Pay}$$

*From Active Duty Basic Pay Scales for Enlisted Personnel (Table B-2).

TABLE B-2

ESTIMATED FY1966 COST OF PAY AND SUPPLEMENTARY BENEFITS FOR MILITARY PERSONNEL ON ACTIVE DUTY

DEPARTMENT OF DEFENSE

	All Personnel			Officers			Enlisted		
	Annual Amount	Dollars Per Capita	Percent of Pay	Annual Amount	Dollars Per Capita	Percent of Pay	Annual Amount	Dollars Per Capita	Percent of Pay
1. PAY									
Basic Pay	$ 7,769,373,000	$2,940.27	60.06%	$2,407,913,000	$ 7,190.50	66.03%	$ 5,361,460,000	$2,323.46	57.72%
Quarters (allowances and quarters furnished)	2,251,978,000	852.24	17.41	539,621,000	1,611.42	14.80	1,712,357,000	742.07	18.44
Subsistence (rations and allowances)	1,147,531,000	434.27	8.87	192,405,000	574.56	5.28	955,126,000	413.9[illegible]	10.28
Hazardous duty	362,472,000	137.17	2.80	261,922,000	782.15	7.18	100,550,000	43.57	1.08
Clothing (allowances and clothing furnished)	243,507,000	92.15	1.88	10,774,000	32.17	.30	232,733,000	100.86	2.51
Reenlistment bonus	144,772,000	54.79	1.12	---			144,772,000	62.74	1.56
Sea duty and duty at certain places	74,945,000	28.36	.58	---			74,945,000	32.48	.81
Medical incentive pay	37,699,000	14.27	.29	37,699,000	112.58	1.03	---		
Proficiency pay	122,053,000	46.19	.94	---			122,053,000	52.89	1.31
Family separation	47,351,000	17.92	.37	9,313,000	27.81	.26	38,038,000	16.48	.41
Hostile duty	8,766,000	3.32	.07	2,241,000	6.69	.06	6,525,000	2.83	.07
Federal income tax exemptions	662,042,000	250.55	5.12	183,621,000	548.33	5.04	478,421,000	207.33	5.15
Terminal leave payments 1/	58,947,000	22.31	.46	---			58,947,000	25.55	.63
Miscellaneous	3,359,000	1.27	.03	771,000	2.30	.02	2,588,000	1.12	.03
TOTAL, PAY	$12,934,795,000	$4,895.08	100.00%	$3,646,280,000	$10,888.51	100.00%	$ 9,288,515,000	$4,025.30	100.00%
2. SUPPLEMENTARY BENEFITS (partly included above)									
Pay for leave, holidays and sickness	$ 1,041,969,000	$ 394.33	8.06	$ 293,728,000	$ 877.13	8.06	$ 748,241,000	$ 324.26	8.06
Military retirement 2/	1,894,946,000	717.13	14.66	575,491,000	1,718.51	15.78	1,319,455,000	571.81	14.20
Social Security employer tax	266,701,000	100.93	2.06	60,286,000	180.03	1.65	206,415,000	89.45	2.22
Dependency and Indemnity Compensation 2/	103,084,000	39.01	.80	35,256,000	105.28	.97	67,828,000	29.39	.73
Death gratuity	8,087,000	3.06	.06	2,424,000	7.24	.07	5,663,000	2.45	.06
Burial costs	4,240,000	1.60	.03	801,000	2.39	.02	3,439,000	1.49	.04
Medical care:									
Service personnel	335,000,000	126.78	2.59	42,455,000	126.78	1.16	292,545,000	126.78	3.15
Dependents (including DMC)	372,600,000	141.01	2.88	79,916,000	238.64	2.19	292,684,000	126.84	3.15
Separation pay:									
Terminal leave 3/	182,041,000	68.89	1.41	48,978,000	146.26	1.34	133,063,000	57.66	1.43
Severance pay (medical and non-promotion)	18,305,000	6.93	.14	10,691,000	31.93	.29	7,614,000	3.30	.08
Reserve readjustment	250,000	.09	.00	250,000	.75	.01	---		
Unemployment compensation	86,653,000	32.79	.67	2,166,000	6.47	.06	84,487,000	36.61	.91
Commissaries	80,620,000	30.51	.62	16,978,000	50.70	.47	63,642,000	27.58	.69
Post exchanges	53,614,000	20.29	.41	9,571,000	28.58	.26	44,043,000	19.09	.47
Civilian education	14,322,000	5.42	.11	11,401,000	34.05	.31	2,921,000	1.27	.03
Recreational facilities	75,229,000	28.47	.58	13,429,000	40.10	.37	61,800,000	26.78	.67
Mortgage insurance premiums	4,940,000	1.87	.04	3,123,000	9.33	.09	1,817,000	.79	.02
TOTAL, SUPPLEMENTARY BENEFITS	$ 4,542,601,000	$1,719.11	35.12%	$1,206,944,000	$ 3,604.17	33.10%	$ 3,335,657,000	$1,445.55	35.91%
Included in pay, above	1,462,867,000	553.61	11.31	371,361,000	1,108.95	10.18	1,091,506,000	473.02	11.75
In addition to pay	3,079,734,000	1,165.50	23.81	835,583,000	2,495.22	22.92	2,244,151,000	972.53	24.16
GRAND TOTAL, PAY AND SUPPLEMENTARY BENEFITS	$16,014,529,000	$6,060.58	123.81%	$4,481,863,000	$13,383.73	122.92%	$11,532,666,000	$4,997.83	124.16%

1/ To personnel continuing on active duty only. Payments to terminated personnel are included below in the supplementary benefits.
2/ Annual accrual on an actuarial basis.
3/ To terminated personnel only.

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APPENDIX C

MAINTENANCE COST DATA FOR E-2A/ATDS

This Appendix is classified CONFIDENTIAL; it has been omitted from this unclassified edition.